SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

CLXXVI.] SEPTEMBER, 1880. [PRICE FOURPENCE. *or 5s. per ann. post free.*

THE BRITISH ASSOCIATION AT SWANSEA.

WHEN describing the poor meeting held at Sheffield in 1879, we said—"We hope that in 1881 things will turn round, for it would be unreasonable to expect a large attendance at Swansea, where the meeting is to be held in 1880." The Swansea meeting was even smaller than we expected, the total number present being only 914, which is very little more than attended the meeting in the same town thirty years before.

The list of the Meteorologists present is, however, not much shorter than that of those at Sheffield—26 instead of 30.

Beaufort, W. M.	London.
Brady, Sir Antonio	Stratford.
Casella, L. P.	London.
Davies, Rev. R. P.	Fairford.
Elliot, R.	Hawick.
Ellis, W. H.	Exeter.
Evans, J., F.R.S.	Hemel Hempstead.
Everett, Prof. J. D., F.R.S.	Belfast.
Fordham, H. G.	Royston.
Galton, F., F.R.S.	London.
Gilbert, J. H., Ph.D., F.R.S.	Harpenden.
Glaisher, J., F.R.S.	Blackheath.
Harrison, J. P.	Sheerness.
Hopkinson, J.	Watford.
Howlett, Rev. F.	East Tisted.
Jackson, M.	Ramsgate.
Latham, Baldwin, C. E.	London.
Lefroy, Lt.-Gen. Sir J. H., F.R.S.	London.
Mello, Rev. J. M.	Chesterfield.
Muirhead, H., M.D.	Cambuslang.
Pengelly, W., F.R.S.	Torquay.
Ragona, Prof. D.	Modena.
Russell, Hon. F. H. R.	Richmond.
Smith, Prof. H. J. S., F.R.S.	Oxford.
Talmage, C. G.	Leyton.
Williams, C. J. B., M.D., F.R.S.	Cannes.

There were very few meteorological papers, and not one local communication appears in the following list :—

1.	Anderson, R.	On the necessity for a regular inspection of Lightning Conductors.
2.	Everett, Prof. J. D.	Report of the Committee on Underground temperatures.
3.	Fox, H. Courtenay.	On the synchronism of mean temperature and rainfall in the climate of London.
4.	Galton, F.	On determining the heights and distances of clouds.
5.	Latham, B.	Temperature of town water supplies.
6.	Muirhead, Dr.	On the length of the sun spot period.
7.	Preece, W. H.	On the best form of Lightning Conductors.
8.	Ragona, Prof. D.	On the laws of the change of speed and direction of the wind.

ON THE BEST FORM TO GIVE TO LIGHTNING CONDUCTORS.

Mr. W. H. Preece read a paper on this subject. The question was whether the lightning conductor should be a solid rod, or tubular, or flat. Snow Harris, Prof. Henry, M. de Melsens, and M. Guillemin advocated straps of great surface. Faraday strongly maintained that there was no advantage in strap or tube forms, as the surface does nothing in conducting the current. Mr. Preece had obtained the use of Dr. De La Rue's magnificent batteries, and had procured conductors of equal material, length and weight, but differing in form. A condenser charged from 3,400 cells afforded a very powerful source of electricity, more than forty-two microfarads being thus available to produce an enormous spark. Experiments made by heating and deflagrating wires through the different conductors left no doubt that these discharges do obey the law of Ohm, and therefore that the additional surface of flat and tubular conductors is of no advantage in their conductivity.

Prof. Osborne Reynolds rather doubted the conclusions of Mr. Preece, on account of our not knowing the conditions under which the electricity passes from the air into the surface of the conductor.

Prof. Ayrton thought the experiments should be tried with much greater difference of potential. The 3,000 cells would not produce a free spark of more than 1-40th of an inch long, whereas flashes of lightning might extend over miles.

Mr. Preece, in replying, pointed out that increased surface, though increasing its inductive capacity, did not add to its efficiency, which depended only on its conductivity.

ON THE NECESSITY FOR A REGULAR INSPECTION OF LIGHTNING CONDUCTORS.

By Richard Anderson, F.C.S., A. Inst. C.E.

The author referred to a paper by M. W. de Fonvielle, "On the Advantage of keeping Records of Physical Phenomena connected with Thunderstorms," read before the Association in 1872, in which M. de Fonvielle recommended to the attention of the members the steps which had been taken by the French Government for obtaining

information regarding thunderstorms, and suggested that the Association should institute some organization for the collection of such data; arguing that it would be of much value to science, as well as to the public. Nothing, however, has been done by the Association since 1872; and the author not only confirmed the conclusions at which M. de Fonvielle arrived as to the desirability of collecting such data, but was of opinion that the organization should go further, and arrange for a regular inspection of all public buildings which had lightning conductors applied.

The necessity for this he demonstrated by adducing a number of striking cases where damage, more or less severe, had occurred to buildings, even though having lightning conductors attached to them. The cases now cited, he explained, were supplementary to those communicated in his paper on a similar subject to the Association in 1878. A few of the cases were as follows :—

In October, 1878, an elevated building situated at the back of Victoria Station, occupied as a furniture repository, was struck by lightning and sustained damage, although furnished with a $\frac{3}{4}$-inch by $\frac{1}{8}$-inch copper band lightning conductor and a tube of $\frac{5}{8}$-inch diameter rising above the iron crestings on the tower. The lightning shattered the cresting and bent the point of the lightning-rod, besides doing other damage to the building. On testing, the author found the resistance very great, and on opening out the earth-terminal found it imbedded in concrete.

On June 26th last, lightning struck All Saints Church, Lambeth, doing considerable damage, although there was a $\frac{3}{8}$-inch diameter copper-rope conductor on the west gable, with a copper tube rising 18 inches above. A stone cross about 50 feet from the conductor was thrown down, injuring the roof of the north aisle. On testing the conductor, the author found that it had no "earth" whatever, the rope being simply placed in 2 inches of loose rubbish. The copper was of very inferior quality; conductivity being 32·10 per cent., or about double that of iron.

The author concludes from this evidence that it is not sufficient merely that rods of copper should be attached to a building, but it is necessary that, after being fixed, they should be regularly inspected, to see if they are in good order, so as to be really efficacious.

ON THE SYNCHRONISM OF MEAN TEMPERATURE AND RAINFALL IN THE CLIMATE OF LONDON.

By H. Courtenay Fox.

This was a sequel to the paper with the same title read by the author at Sheffield (*Met. Mag.* vol. xiv., p. 124). The following are the conclusions arrived at :—

A cold spring is very prone to be followed by a cold summer, a cold summer tends to be followed by a cold autumn, and a cold autumn has a slight tendency to be succeeded by a winter of low temperature. Warm summers are generally followed by warm

autumns. In no fewer than eight out of the twelve months (that is, in every one except February, March, May, and October) very low temperature tends to be prolonged into the succeeding month. If June, July, August, or December be warm, the next month will probably be a warm one also; two months, June and July, tend when very dry to be followed by dry ones. On the other hand, a dry August indicates the probability of a wet September. A wet December is apt to be succeeded by a wet January. In addition to the foregoing there are also a few instances in which the rainfall of certain months appears to be definitely related to antecedent extremes of temperature and *vice versâ*. Thus if August or September be warm the ensing September or October inclines to be wet. If, on the other hand, September or November be cold, the succeeding October or December is likely to be a dry month. If February, June, or July be very dry, the next month has a strong tendency to be warm; if January, March, or April be wet, we may also expect the next month to be a warm one, but a wet May or July gives a strong probability of cold weather in June or August respectively.

ON THE LENGTH OF THE SUN-SPOT PERIOD.

By Henry Muirhead, M.D.

It is well known to all who take an interest in the phenomena of sun-spots, that men of science are far from being agreed as to the length of the period intervening between one maximum epoch and another. I should think, however, that those who wish to prove that our rain, our storms, terrestrial magnetism, harvests of grain and vintage, with commercial crises, &c., depend a good deal on how the sun gets his face besmirched, should first of all make sure of the real length of the sun-spot period. To help towards its fixation I beg to bring under the notice of the Section the following table arranged from Wolf's *latest corrected* relative sun-spot numbers, from 1770 to 1877. The numbers are arranged to correspond with Jupiter's period of 11·863 years. Each vertical column (save one) commences with the year in which Jupiter's heliocentric longitude is $263\frac{3}{4}°$. The last column is the summation. The dates of the cycles were chosen on the supposition that much of the sun's radiance arises from matter impinging on his atmosphere—just as so-called star-showers light up ours—and that when Jupiter is in or near the front of the sun's march in space (*i.e.*, hel. long. $263\frac{3}{4}°$) he intercepts a good deal of the meteoric aggregations which would otherwise impinge against the sun's envelopes, giving rise to sun-spots till sublimated. We know that comets whose aphelia are about as distant as Jupiter's orbit have periods of about five years; so meteoric matter may be supposed to take about two and a half years to come from Jupiter to the sun. Now please observe that the average minimum sun-spot epoch occurs about two and a half years after Jupiter is at R.A. $263\frac{3}{4}°$, and the maximum about six years after the minimum, that is, when we might expect Jupiter's

intercepting influence to be least. But leaving out of account this hypothesis, the fact remains—as the table shows—that the sun-spot period is not 10 years, nor 11, nor 11·1, but seemingly 11·863, corresponding with Jupiter's period. It is to this conclusion that I wish to call the attention of meteorologists and others, who wish to show a correspondence between their various periodicities and those of sun-spots. In 1875 I brought this before the Philosophical Society of Glasgow, and also produced evidence to show Jupiter's influence on terrestrial magnetism.

Year of Jovian Period.		July 19, 1770.	May 30, 1782.	April 29, 1794.	Feb. 17, 1806.	3 days before 1818.	Nov. 10, 1829.	Sept. 19, 1841.	July 31, 1853.	June 10, 1865.	Sums of the numbers.
1	...	79	33	34	25	34	54	30	38	31	358
2	..	43	22	22	15	22	59	20	19	16	238
3	...	49	5	15	7	9	39	9	7	7	147
4	...	40	21	8	3	4	22	13	4	37	152
5	...	48	87	4	0	3	8	33	22	74	279
6	...	28	105	10	1	1	11	47	51	139	393
7	...	35	108	18	5	7	46	79	96	111	505
8	...	63	111	39	14	17	97	100	96	102	639
9	...	95	84	58	20	29	111	96	77	66	636
10	...	90	53	65	35	40	83	64	59	45	534
11	...	73	47	75	45	53	68	62	44	17	484
12	...	68	40	50	44		52	52	47	11	364
					Dec. 29, 1817.						

ON FINDING THE HEIGHTS OF CLOUDS.

Mr. Francis Galton read a paper on "Determining the Heights and Distances of Clouds." He said that this might be done by their reflection in a low pool of water and in a mercurial horizon. The calm surface of a sheet of water might be made to serve the purpose of a large mirror, in a gigantic vertical range-finder, whereby a sufficiently large parallax might be made for the effective measurement of clouds. The observation of the height and thickness of the different strata of clouds, and of the rates of movement, was at the present time perhaps the most promising, as it was the least explored branch of meteorology. As there were comparatively few places in England where the two conditions were found of a pool of water, well screened from wind, and of a station situated many feet in height above it, the author hoped, by the publication of this memoir, to induce some qualified persons, who had access to favourable stations, such as existed in Wales, to interest themselves in the subject, and to make observations. The necessary angles might be obtained with a sextant and mercurial horizon; but it would be convenient to have in addition a tripod stand, with a bar of wood across the top to support the mercurial trough, with some simple instrument for the rapid and rough measurement of altitudes.

WEATHER PREDICTION.

To the Editor of the Meteorological Magazine.

SIR,—In a communication which you were good enough to insert in your last number I directed attention to the failure of Mr. Brumham's prediction of "very great heat" and "fine summer weather" in the last fortnight or three weeks of June. We have now another failure to chronicle, as Mr. Brumham also predicted that the month of July would have a "high mean temperature," and the reverse has been the case. The official figures in the weekly Weather Reports issued by the Meteorological Office are as follows:—Temperature for England (S.) for week ending July 5th, 3° below average; July 12th, 4° below average; July 19th, average; July 26th, 1° below average; August 2nd, 3° below average.

I agree with you, Sir, that we should be slow to do anything to discourage any honest and disinterested investigations into the laws of weather, even though they should be carried on upon lines which do not seem to us to promise any useful results. The chemical investigations of the alchemists in their search after the philosopher's stone, futile as that search was in reference to its immediate object, are said to have laid the foundations of the science of chemistry, and there can be no doubt that observations carried on by the old astrologers for the purpose of calculating horoscopes and other similar absurdities, did much to advance the science of astronomy. And in this point of view it is quite possible that the attempts made by Mr. Brumham and others to predict the character of coming seasons may bear unexpected fruit in some future generation, when the science of meteorology has reached the predictive stage. At the same time, I think you will, on reflection, admit that the numerous body of meteorologists who, like myself, are convinced that Meteorology has not yet reached the stage which would justify attempts at seasonal predictions, are within their rights in endeavouring to divert the industry and perseverance of such men as Mr. Brumham into what they think to be more profitable channels of investigation. And, therefore, if you will allow me to say so, I think you ask us to concede a little too much when you claim our "sympathy and support" on behalf of the school represented by Mr. Brumham. Let me try to illustrate my meaning by an analogy taken from another science. A person who persisted in boring for coal amidst strata where the established facts of geology showed that it was impossible, or, at least, highly improbable that coal should be found, could hardly expect to have the sympathy and support of geologists with him in his enterprise, even though he were actuated by the most disinterested motives, and had spent much time and energy in the prosecution of the work, from which he expected no personal profit. And, though the analogy is not in all respects exact, this seems to me to be a fair illustration of the position, with reference to the great majority of meteorologists, of Mr. Brumham and the

numerous class of weather prophets who claim to be able to make predictions based on "lunar laws of the weather."

And though, as you rightly remind us, ridicule is somewhat out of place in a discussion of this kind, I think even you, Sir, must admit that the dogmatic and confident tone adopted by many of the weather prophets in enunciating their theories is calculated to provoke, if it does not justify, a little sarcasm from the sceptically inclined, when the theories break down. Take, for instance, the following utterance of Mr. Jinman, in the *Nautical Magazine* for April. Speaking of what he calls "the Eurydice storm and period," he writes:—"I have proved to demonstration that its return and its effect on the barometer, force and direction of wind, &c., can be calculated as readily as the elements of a solar eclipse." Again, "there is one, at least, who can tell by actual calculation, not only three days, but three weeks, months, or years, in advance." And once more, "the law of the circulation of our atmosphere is as perfect as the law which governs the solar system, the basis of the law being this,—the earth is girded parallel to and at right angles with the Magnetic equator by certain magnetic and electric cloud and earth-bands, and it is by the revolutions, crossings, reversings, and changes, *all of which can be calculated with mathematical precision*, that all atmospheric changes are produced." Now, when predictions announced in this style result in entire failure, is it not almost too much to expect an adverse critic to speak of them in that calm philosophic tone which should, as far as possible, pervade all scientific discussions?

But my scepticism is not by any means confined to prophecies of this kind. I maintain that the general result of recent weather predictions, including several by men of high standing in the scientific world, has been such as to establish my contention that meteorology has not yet reached the stage which can justify attempts to predict the weather of a year or even of a season. Take a few of the more notable of such prophecies within the past three or four years as specimens.

1st. In September, 1877, Professor Piazzi Smyth, in a communication published in *Nature*, announced that "the next cold wave" was "due" at the end of that year. And, in a subsequest communication, on which I cannot now lay my hands, he gave further particulars, if my memory serves me, tending to show that the coming winter should be one of very exceptional severity. The winter, however, was not marked by any exceptional cold, nor even by any prolonged period of ordinary cold.

2nd. In the same communication Professor Smyth announced that "the next great heat wave" might "be looked for in 1879·6" (which, translated into ordinary English, means, I suppose, about the middle of 1879), "within limits of half a year each way;" about as unfortunate a prophecy as could possibly have been made, inasmuch as the year 1879 proved to be one of the coldest years of the century, both as regards duration and intensity of cold.

3rd. It would appear that Professor Smyth has since seen reason to postpone the advent of his "heat-wave" to the present year, but as far as the present year has run, with no more credit to his reputation as a weather-prophet.

4th. Mr. Lowe, of Nottingham, whose character as an observer and naturalist stands so deservedly high, meets with no better fortune when he enters upon the dangerous field of prophecy. In a letter to the *Times*, dated May 16, 1879, he writes: "a period of drought is now apparently at hand, and the summer of 1879 may be expected to be very similar to that of 1868"(!)

5th. As I fear I have already trespassed too far upon your space, I will only give one more example. Mr. Roe, of Poyntington, writing also to the *Times*, under the appropriate date of St. Swithin's Day, 1879, after announcing his discovery that dry and wet periods succeed one another in triads of three whole years each, and giving a charmingly simple arithmetical rule for the determination of the time when a dry or wet period is due, predicts that the summer of 1880 will be the first of "a triad of hot and dry summers." Now, Sir, when these are the results of weather-predictions, even when taken in hand by men of the attainments of Professor Smyth and Mr. Lowe, are we not justified in surmising that there must be something radically faulty in methods of enquiry which lead to such results? And would it not be far better, until we have more reliable data upon which to found our forecasts, to drop the prophet's mantle, and instead of attempting weather-prediction on the grand scale, be content to labour at laying the foundations on which a future generation may, perchance, build up a really reliable system of weather prediction.

Yours very truly,

G. T. RYVES, F.M.S.

Tean Vicarage, Stoke-on-Trent, Aug. 6th, 1880.

WHITE AURORA BOREALIS ON AUGUST 12TH, 1880.

To the Editor of the Meteorological Magazine.

SIR,—After a period of rarity so marked and so long that it had all the charm of novelty, added to its own beauty, there was on August 10th one of the finest displays of aurora which I have seen. The circumstances were favourable for seeing its full beauty, this village being nearly a thousand feet above the level of the sea, and the sky not only free from visible cloud but also absolutely free from mist. A hot summer day had faded through a beautiful sunset—reddish-yellow, with a few distant cirri near the north horizon, and I was sitting in the open-air watching the August meteors, several of which were very fine, brighter than Arcturus, and left trains visible for two or three seconds. Suddenly at about 10.20 one of our party exclaimed, "What *is* that light?" I immediately replied, "A very fine aurora," for in less than a minute white streamers rushed up from the W.N.W., until one of them nearly reached the zenith. Within a

minute or two, a double arch of white was thrown from about W.N.W. to N.N.E., the lower arch wholly below the principal stars of Ursa Major, and the upper arch wholly above them. At 10.27 a streamer rose from nearly N.E., and reached into Cassiopea. At 10.34 there was a good streamer reaching from nearly the horizon, right through Ursa Major, and another at 11.7, which was perceptibly tinged with green. At 11.25 there was scarcely a trace of light, but afterwards about 11.35 there was a body of greenish white aurora in the N.N.W., in which the wave-like motion was extremely noticeable; the intensity of the pulsations soon decreased, but they were perceptible until nearly midnight.

G. J. SYMONS.

Shap, Westmoreland, September 1st.

RAINFALL PERIODICITY.

To the Editor of the Meteorological Magazine.

SIR,—Having noticed the tendency of heavy falls of rain to occur about the 25th of each month, as mentioned by Mr. Newnham in your last month's number, I have taken out the number of months in each year from 1872-9 inclusive (the eight years during which a record of rainfall has been kept here), in which the maximum fall in the 24 hours occurred between the 23rd and 28th of the month, that period of six days being specially mentioned by Mr. Newnham.

In 1872	the maximum fall occurred between the 23rd and 28th of the month	in 6 months out of the 12
1873	" " "	3 " "
1874	" " "	5 " "
1875	" " "	0 " "
1876	" " "	3 " "
1877	" " "	2 " "
1878	" " "	5 " "
1879	" " "	4 " "
	Total ...	28

Thus in the whole term of eight years or 96 months the maximum fall happened, within the period named, no less than 28 times; whereas, assuming the six days to be a fifth of the month, it should only have occurred 19 times, an excess of about 47 per cent. I am quite aware that eight years is too short a term on which to base any decided theories as to rainfall; still it is remarkable that the records here should bear out so strongly the tendency observed by Mr. Newnham.

I am, Sir, yours faithfully,

J. W. SCOTT.

Muswell Hill, N., Sept. 3rd, 1880.

[We have long entertained an indefinite impression roughly accordant with the above, and, in fact, an approximation to it will be found in Vol. II. of this Magazine, page 138, under the title of "Is the Royal Charter Gale Periodic?" Since receiving the above letter

we have worked up the corresponding data for the twenty-two years register kept at Camden Square by ourselves. The subject will be rendered more clear by a diagram, and is altogether too extensive for a postcript, and we will therefore merely say that the facts appear to us very striking, and that they conform generally to those stated by Mr. Scott. We will endeavour to put them clearly before our readers next month.—ED.]

THE WEATHER IN AUGUST.

DURING the first two days the weather was showery generally, and very low temperatures for time of year were reported. The weather during the greater part of the next six days also was dull, very showery, and in some cases thundery. A favourable change took place on the 8th, and the 9th was very fine and bright in all except the extreme western parts of the kingdom.

The charts of the 3rd shewed high pressure over the Bay of Biscay, with a main area of *low* readings over Scandinavia, and a secondary depression over northern Germany. On the 4th a brisk decrease of atmospheric pressure began in the W. of Ireland, spreading slowly, until it comprised the whole of our islands and France, the change being very slight in the S.E., but moderately brisk on the N. and W. coasts of our islands and over the Bay of Biscay. The general distribution of pressure had, however, undergone but little change, except that, owing to the excess of decrease in the W. of France, the area of highest pressure was transferred to over N. Germany and north-western France. The charts of the 5th gave no sign of a coming improvement in general conditions. The depression which advanced to the N.W. of Scotland on the 3rd remained in the same position till the 7th, when it moved off across the North Sea; and a subsidiary that had developed over the English Channel dispersed. Pressure continued increasing in southern France, and a slight recovery took place in the S.E. of England; but elsewhere the mercury fell, the change in the S.W. being considerable, owing to the arrival over Ireland of a new depression from the Atlantic. This disturbance advanced eastward during the 7th, until at 8 a.m. on the 8th its centre was near Amsterdam. This depression was the cause of a gale on our S.W. and S. coasts, and of very heavy rain over the larger portion of the United Kingdom. At that stage of its progress the disturbance changed its course from an easterly to a northerly one, and on the morning of the 9th was over the Skager Rack. In its rear pressure increased; but the rise in the S.W. was very slight, and the advent of a fresh disturbance seemed likely. An anticyclone lay over the southern part of the Bay of Biscay, and a smaller area of high pressure over Ireland.

Temp. this week (3rd–9th) was rather above the average in E. Scotland, equal thereto in N.E. England, but slightly below it in all other parts of our island. The max. occurred mostly on the 5th, and in London was 78°. The lowest reading was at Markree Castle on the morning of the 9th, 40°.

Rainfall below the mean in E. Scotland and S.W. England, equal thereto in southern England, above elsewhere. Heaviest falls :—2·48 in. at Manchester, 2·05 in. at Stonyhurst, and 1·95 in. at Holyhead.

Bright sunshine was, at nearly all places, less prevalent than during the preceding week. The duration was wonderfully uniform, the per centage of total possible duration varying from 39 in N.E. England to 33 in central England and northern Ireland.

The weather during the next week, although dull at times, was much finer than during some time previous, and very dry.

During the night (9th–10th) the bar. rose over the whole of western Europe, and readings became uniformly high in France, England and Ireland. By the following morning this area had assumed much larger proportions, and embraced the N. of France, the whole of our islands, and a part of Scandinavia.

Over the Mediterranean and off our N.W. coasts areas of comparatively low readings were shewn. Next day (11th) pressure was increasing a little over Ireland, Scotland, and northern Scandinavia; but over the larger part of England and France a decrease took place; the anticyclone being thus shifted to over Scotland and Norway. The only difference in the appearance of the next day's charts was, that the anticyclone had "drawn in" somewhat. On the 13th and in the course of the night (13th–14th) a slight fall of the bar. occurred over the greater part of W. Europe; readings were comparatively high and very uniform over Scandinavia and the N. and W. of these islands, whilst the lowest readings were still reported from the S.E. of France. Quite insignificant were the changes in the distribution of pressure during the two following days, 14th and 15th. In the course of the 16th the bar. rose somewhat over the whole of our islands, most in the N., but fell slightly in S. France, where, however, a recovery soon began; hence readings varied from rather above 30·3 in. in Scotland to about 29·9 in. in the south part of the Bay of Biscay.

Temp. was more than the mean over the whole of our islands (especially so in Scotland and Ireland), except E. England, where it was about the mean. The max. were much in excess of those observed for a long time previous, the highest being 82° in N. Ireland, and 79° to 81° in most other districts. The min. occurred on the morning of the 10th, when the ther. fell to 45° in eastern and central England; the nights were, however, generally mild.

Rainfall almost nil, except in S. Ireland, and even there very slight.

Bright sunshine showed a large increase over the week previous, but nowhere was the per centage very great. Max. duration:—66 hours at Pembroke, 64 hours at York, 62 hours at Stonyhurst. Min. duration:—36 hours at Hillington.

During the next week (17th–23rd) the weather was very dry, although the sky was in most districts very cloudy.

A rather decided fall of the bar. began in the N. of our Islands during the 17th, while over France the mercury shewed an inclination to rise: hence the area of high pressure in the N. began to move slowly southwards. This fall of the bar. in the N. was interrupted during the night (19th-20th), while on the S.W. and S. coasts of England and Ireland the mercury rose slowly; the centre of the anticyclone consequently changing its position a little. During the next 24 hours barometric pressure increased somewhat over the whole of our islands—the rise being greatest in the N., so that the anticyclone returned to the position which it occupied prior to the decrease of the 19th. No appreciable change occurred during the remainder of the week.

Temp. was rather less than the mean over central England, and at some places in N.E., E., and N.W. England, but slightly more than the mean in the W. and S., as well as in E. Scotland. The max. was on no day very high, 78° at Barnstaple and in London being the highest. At Durham the ther. fell to 42° on the 20th, but elsewhere the minima were between 45° and 47°.

Rainfall very slight throughout our islands.

Bright sunshine, except in the S.W., was of extraordinarily short duration. Max. duration:—55 hours at Valentia, and 50 hours at Southampton and Pembroke. Min. duration:—2 hours at Churchstoke, 5 hours at Leicester, 11 hours at Kelstern (Lincolnshire), 12 hours at Cirencester, and 14 hours at York and Oxford.

The weather of the last week, although much brighter than during the preceding one, was again rather dull over the greater part of the kingdom, especially so over the inland districts. Thunderstorms occurred at many places on the 26th, and again at a smaller number of places on the 29th.

During the night (24th–25th) the bar. fell a little more appreciably than it had done for some days previous all along our W. and S.W. coasts, as well as over the Bay of Biscay, while scarcely any change occurred in the N.E. In the N. of Scandinavia, however, a decided rise took place. The bar. fell about a tenth of an inch over the whole of our islands during the 24 hours following, but rose in Scandinavia. In the meantime depressions of irregular shape

appeared over our W. and S. districts, and the weather became very unsettled. The relative distribution of pressure in N.W. Europe, however, underwent a complete change in the course of the night (26th–27th), owing to a rise of the bar. over the whole of our islands, amounting to 0·3 in. in S. Ireland, and to 0·1 in. on our N.E. coast. Pressure continued to increase during the next 24 hours over the whole of our islands, but decreased again in the course of the 28th and 29th.

Temp. above the average, the excess in S. England, in Scotland and Ireland being as much as 4° or 5°. The max. took place mostly on the 28th, when a temp. of 81° at Hastings and in London, and 80° in Ireland was recorded. The min. occurred on the 24th, when at Churchstoke 43° was registered.

Rainfall less than the mean in all parts of our islands, except at Valentia and Nottingham, where the rain measured amounted to 2·04 in. and 1·06 in. respectively.

Bright sunshine was more frequent than in the previous week, but the recorded number of hours was still rather small. Max. duration :—63 hours at York, 51 hours at Silloth, 48 hours at Valentia. Min. duration :—15 hours in London and 22 hours at Aberdeen and Durham.

Lowestoft. H. E. M.

AUGUST METEORS.

THE August meteors were observed by Mr. W. F. Denning, at Bristol, and by Mr. H. Corder, at Writtle, in Essex. The former made observations every night during 6th to 13th inclusive, and recorded 419 shooting stars, of which 240 belonged to the shower of streak-leaving Perseids. There was a dense fog on the 10th, so that the apparent maximum occurred on the 9th, when meteors were falling at the rate of 44 per hour for one observer. Mr. Corder saw 415 meteors, including 254 Perseids, between July 29 and August 11, and he estimated that on the 10th, when the sky was very unfavourable to observation, there were 40 Perseids per hour. Mr. Denning noted a fair proportion of brilliant meteors. Several were equal to Venus, and many were comparable either to Mars or Jupiter, and the luminous streaks they left in their paths formed a conspicuous feature of the display, and enabled the directions of their flights to be registered with great accuracy.

General Myer.

GENERAL ALBERT J. MYER, of the Signal Service in the United States, who for 22 years rendered invaluable service to that country in observing and reporting approaching changes in the weather, died in Buffalo, on the 24th of August, in the 52nd year of his age. General Myer became identified with the Signal Service when he was only 30 years old, and since then his name has become synonymous with that of this important service, and he has been familiarly known as "Old Probabilities." His services were equally valuable in peace or in war. In 1854 he entered the army as an assistant-surgeon. He was assigned to special duty in the Signal Service in 1858, and remained on that duty till 1860, when he was made chief signal officer of the army, with the rank of major. He was not the originator of the idea of making use of the telegraph for conveying information in regard to the weather—that honour is generally by Americans conceded to the late Professor Henry of the Smithsonian Institution—but General Myer took up the idea, developed and expanded it, and brought it into successful use. It is stated that 50 per cent. of the "probabilities" are fully verified, and 25 per cent. verified in part. The failures are only 25 per cent.—*Times, Sept. 9th.*

SUPPLEMENTARY TABLE OF RAINFALL IN AUG., 1880.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	1·50	XI.	Corwen, Rhug	2·27
,,	Margate, Acol	1·59	,,	Port Madoc	2·64
,,	Littlehampton	·90	,,	Douglas.....	·67
,,	St. Leonards	·55	XII.	Carsphairn	·55
,,	Hailsham	·41	,,	Melrose, Abbey Gate...	·95
,,	I. of W., St. Lawrence.	·57	XIV.	Glasgow, Queen's Park.	·76
,,	Alton, Ashdell.....	1·32	XV.	Islay, Gruinart School..	1·71
III.	Great Missenden.....	·98	XVI.	Cupar, Kemback.....	·65
,,	Winslow, Addington ...	·84	,,	Aberfeldy H.R.S.	·00
,,	Oxford, Magdalen Col...	·30	XVII.	Tomintoul.....	1·17
,,	Northampton	·69	,,	Keith H.R.S.	·50
,,	Cambridge, Merton Vil.	1·39	,,	Forres H.R.S.	·10
IV.	Harlow, Sheering	·98	XVIII.	Strome Ferry H.R.S....	2·35
,,	Diss	1·62	,,	Auchnasheen H.R.S. ...	...
,,	Swaffham	2·86	,,	Lochbroom	·69
,,	Hindringham	1·90	,,	Tain, Springfield.....	·57
V.	Salisbury, Alderbury...	1·59	,,	Loch Shiel, Glenfinnan.	3·40
,,	Calne, Compton Bassett	·99	,,	Dalwhinnie H.R.S.....	...
,,	Beaminster Vicarage ...	·63	XIX.	Lairg H.R.S.	·84
,,	Dartmoor, Princetown..	1·20	,,	Altnabreac H.R.S.	·13
,,	Langtree Wick	1·15	,,	Watten H.R.S.	·27
,,	Lynmouth, Glenthorne.	·98	XX.	Fermoy, Glenville	1·64
,,	St. Austell, Cosgarne...	·36	,,	Tralee, Castlemorris ...	...
,,	Taunton	·17	,,	Cahir, Tubrid	1·97
VI.	Bristol, Ashleydown ...	·53	,,	Tipperary, Henry St....	1·60
,,	Ross	·30	,,	Newcastle West	...
,,	Wem, Sansaw Hall.....	1·34	,,	Kilrush	2·01
,,	Cheadle, The Heath Ho.	3·42	,,	Corofin	2·17
,,	Bickenhill Vicarage ...	·90	XXI.	Kilkenny, Butler House	1·81
VII.	Melton, Coston	1·57	,,	Carlow, Browne's Hill..	2·35
,,	Horncastle, Bucknall ...	1·90	,,	Kilsallaghan.....	...
VIII.	Walton-on-the-Hill.....	1·75	,,	Navan, Balrath	1·63
,,	Broughton-in-Furness ..	1·84	,,	Athlone, Twyford	1·78
IX.	Wakefield, Stanley Vic.	1·86	,,	Mullingar, Belvedere ...	1·26
,,	Ripon, Mickley	1·91	XXII.	Ballinasloe	2·30
,,	Scarborough.....	1·96	,,	Clifden, Kylemore	3·07
X.	Mickleton.....	1·68	,,	Crossmolina, Enniscoe..	2·90
,,	Haltwhistle, Unthank..	·96	,,	Carrick-on-Shannon ...	2·09
,,	Shap, Copy Hill	1·12	XXIII.	Dowra	1·74
XI.	Llanfrechfa Grange	·46	,,	Rockcorry.....	1·09
,,	Llandovery	·82	,,	Warrenpoint	1·08
,,	Solva	·56	,,	Newtownards	·71
,,	Castle Malgwyn	·99	,,	Carnlough.....	1·17
,,	Rhayader, Nantgwillt..	1·21	,,	Bushmills	2·48
,,	Carno, Tybritle	2·06	,,	Buncrana	·98

AUGUST, 1880.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1860–5	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	Camden Square	·45	— 2·19	·21	7	4	82·6	28	47·8	3	0	0
II.		Maidstone (Hunton Court)	1·66	— ·54	·74	26	9	...	...	...	...	...	...
,,		Strathfield Turgiss	·80	...	·45	25	8	78·2	10	43·7	3	0	0
III.		Hitchen	1·00	— 1·35	·28	6	7	72·0	11*	48·0	2, 6	0	...
,,		Banbury	·78	— 1·35	·37	5	9	76·5	28	46·0	24	0	...
IV.		Bury St. Edmunds (Culford)	1·27	— 1·17	·31	7, 25	9	75·0	5	41·0	23	0	...
,,		Norwich (Cossey)	2·74	+ ·84	·85	25	12	76·5	31	47·0	3	0	...
V.		Bridport	·53	— 2·06	·18	7	4	...	...	...	...	...	...
,,		Barnstaple	1·45	— 2·74	·45	25	9	80·5	15	58·0	2	0	...
,,		Bodmin	·58	— 3·28	·18	21	8	80·0	11	54·0	3	0	0
VI.		Cirencester	...	...	...	...	...	...	...	...	...	...	...
,,		Shifnal (Haughton Hall)	·81	— 2·06	·44	7	6	76·0	11	46·0	9§	0	0
,,		Tenbury (Orleton)	·32	— 2·56	·12	1	6	80·0	10	43·7	10	0	0
VII.		Leicester (Town Museum)	1·66	...	·66	7	10	78·2	11	48·6	7	0	0
,,		Boston	2·42	+ ·13	·57	6	7	83·0	12	47·0	3	0	0
,,		Grimsby (Killingholme)	1·59	...	·49	6	9	72·5	10	47·0	1	0	...
,,		Mansfield	2·46	...	1·35	7	11	77·9	10	44·0	1	0	0
VIII.		Manchester (Ardwick)	2·77	— ·74	1·84	8	7	79·0	11	52·0	8	0	0
IX.		York	1·58	— 1·13	·58	7	10	81·0	31	45·0	5	0	0
,,		Skipton (Arncliffe)	2·89	— 3·05	1·45	5	10	80·0	11	42·0	2	0	0
X.		North Shields	1·44	— 1·41	·39	5	17	...	...	...	...	...	...
,,		Borrowdale (Seathwaite)	4·15	— 9·93	2·60	4	9	...	...	...	...	...	...
XI.	WALES.	Cardiff	·77	...	·27	2	7	78·4	11	50·1	10	0	...
,,		Haverfordwest	·64	— 4·24	·27	7	8	80·0	14†	43·5	30	0	...
,,		Aberdovey	3·04	...	·68	6	8	...	...	...	...	...	...
,,		Llandudno	1·86	— 1·96	1·17	7	5	71·0	10	50·5	1	0	0
XII.		Cargen	·50	— 3·69	·15	4	5	81·4	14	43·0	1	0	...
,,		Hawick (Silverbut Hall)	1·55	...	·37	4	10	...	...	...	...	...	...
XIV.		Douglas Castle (Newmains)	·92	...	·50	5	7	...	...	...	...	...	...
XVI.		Loch Long (Arddaroch)	...	...	...	...	...	...	...	...	...	...	...
,,		Kilmory	2·43	...	1·18	4	9	...	...	38·0	1	0	...
,,		Mull (Quinish)	1·19	...	·32	3	11	...	...	...	...	...	...
,,		Loch Leven	·60	— 3·08	·20	6	5	...	...	...	...	...	...
XVII.	SCOTLAND.	Arbroath	·59	— 2·64	·17	4	9	78·0	11	47·0	1, 3	0	...
,,		Braemar	1·23	— 2·61	·75	7	7	76·0	28	39·2	31	0	1
XVIII		Aberdeen	1·05	...	·36	2	12	81·0	10	47·0	2	0	...
,,		Portree	1·78	— 5·67	·64	4	11	...	...	...	...	...	...
,,		Inverness (Culloden)	·55	— 2·70	·30	8	4	75·0	29	45·0	8	0	0
XIX.		Dunrobin	...	...	...	...	...	...	...	...	...	...	...
,,		Sandwick	1·00	— 2·71	·71	5	6	70·8	12	48·0	1	0	0
XX.		Cork (Blackrock)	1·16	...	·40	5	9	89·0	27‡	45·0	8	0	...
,,		Darrynane Abbey	...	...	...	...	...	...	...	...	...	...	...
,,	IRELAND.	Waterford	...	...	...	...	...	...	...	...	...	...	...
,,		Killaloe	2·26	— 2·67	·56	6	12	85·0	11	40·0	9	0	...
XXI.		Portarlington	2·44	— 2·06	·91	6	13	78·5	15	46·0	6	0	0
,,		Monkstown	1·97	— 1·24	1·11	7	8	...	...	...	...	...	...
XXII.		Galway	2·09	...	·80	6	9	79·0	29	45·0	9	0	...
XXIII		Waringstown	1·19	...	·34	4	7	82·0	11	43·0	8	0	0
,,		Londonderry	1·49	...	·97	4	7	76·0	12‖	49·5	2	0	0
,,		Edenfel (Omagh)	2·04	...	1·30	4	7	87·0	14	39·0	1	0	...

* And 28. † And 15. ‡ And 28. ‖ And 15. § And 10, 24.

\+ Shows that the fall was above the average; — that it was below it.

METEOROLOGICAL NOTES ON AUGUST.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—The harvest has rapidly progressed under most favourable circumstances; perfect weather and abundant labour; yield better than was expected. Aurora borealis on the 12th.

BANBURY.—A very dry month, especially the last three weeks, and eminently favourable for the harvest; most of the white corn cut at the end of the month, and a good deal harvested; quality and yield good. Almost incessant L on the night of the 29th, but at considerable distance; T also on the 6th and 7th, and distant T and L on the 25th and 29th.

CULFORD.—The weather has been fine and seasonable, but the harvest has not progressed so rapidly as might have been expected; the absence of sunshine and the abundant undergrowth have retarded the carrying of the grain. Polar winds on 14 days; T on the 2nd, 23rd and 25th. Mean temp. of the month, 61°·3.

COSSEY.—A good harvest month with the exception of five dull but dry days in succession, during which the corn on shock did not harden.

BODMIN.—Mean temp. of the month, 61°·1. Many years have passed since so genial and beautiful an August has been witnessed.

SHIFNAL.—The persistent R with which the last month closed continued daily, with the exception of the 2nd and 4th, until the 9th, when a dry period set in, with wind varying from W. to E., which lasted until the end of the month; it was all that could be desired for the grain harvest, which proceeded uninterruptedly.

ORLETON.—A very dry and favourable month for the harvest; no R fell after the 7th, when a sudden gale of wind set in at 7 p.m. after an hour of calm; very warm with sunshine from 8th to 16th; the sky then became obscured by dull hazy clouds, and for more than six days the sun was never visible; the remainder of the month was fine and hot; the mean temp. was nearly half a degree above the average; the bar. was high and steady; distant T was heard on 6th and 7th, and faint L was seen on the nights of the 26th, 27th and 29th; wheat cutting commenced about the middle of the month.

LEICESTER.—TS on night of 29th, with continuous L from 11 p.m. to 2.30 a.m., and R from 1.30 a.m. to 2.30 a.m.; L also on evening of 26th, and aurora borealis seen at 10.30 p.m. on 12th.

GRIMSBY.—First week wet, rest of month very dry; many days were overcast; close of month splendid weather; corn carrying commenced at end of month, and its improved condition is beyond all expectation; T on 2nd and 26th, L on 27th and 29th, T and L on 6th.

MANCHESTER.—Showery till 7th, on which day R began at noon; the fall up to 3.30 p.m. was 0·70 in., from 3.30 to 6.30 there was a further fall of 0·65 in., from 6.30 p.m. to 11 p.m. 0·44 in., and from 11 p.m. to 9 a.m. on 8th 0·05 in., so that the total was 1·84 in. After this not a drop of R fell during the rest of the month.

YORK.—Remarkably fine month, especially after the 8th; the third week was very cloudy; T on 8th, and distant TS on the 29th.

NORTH SHIELDS.—TSS on 2nd, 5th, 6th and 8th, and T also on 3rd; aurora seen on 12th.

WALES.

HAVERFORDWEST.—The driest, and one of the finest and warmest Augusts during the last 32 years; harvest prospects magnificent; green crops also exceedingly good.

ABERDOVEY.—Very hot all the month.

LLANDUDNO.—A very fine month, but haze or sea fog on 15 days.

SCOTLAND.

CARGEN.—An unusually bright warm month; mean temp. 61°·8, which is about 3° above the average, and during the last 21 years there have only been two months with a higher mean temp., viz., July, 1872, and July, 1878. The grain crops in the neighbourhood have been well secured, and the greater portion is now in the stackyard; T on the 15th and 30th.

HAWICK.—Warm and most genial. Scarcely one grasshopper, and very few red butterflies or dragonflies to be seen. Wasps are, however, unprecedentedly numerous.

NEWMAINS DOUGLAS.—Distant T on afternoon of 3rd.

QUINISH.—A dry, hot month.

BRAEMAR.—A most excellent month for maturing the crops, the quality of which is unusually good; a very bright aurora seen on the 12th and 13th.

ABERDEEN.—Atmospheric disturbances have been prevalent during August; TS in the early days of the month, succeeded on the 12th and 13th by very brilliant displays of aurora borealis, the most vivid seen for many years in this neighbourhood. Temp. of the month very high, while the rainfall has been greatly below the average.

PORTREE.—The driest August on record. The weather has been very warm all through; grain crops are all cut, and two more weeks of fine weather will complete the harvest; it has never been known to be so early in this island before.

CULLODEN.—Rainfall very slight; from the 8th to the close of the month none fell; the weather during this period was exceedingly fine; many days warm and sultry, but without T; sunshine during many days brilliant, and atmosphere generally clear; weather most favourable for harvest, crops fair; a grand display of aurora on the 13th and 14th [? 12th and 13th.—ED.]

SANDWICK.—Rainfall less than in any August since 1846; the temp. was nearly 3° above the average, and the wind was moderate, so that the weather was splendid for the harvest, and the reaping of a luxuriant crop is now general; T and L on 5th; large solar halo seen on 7th; brilliant aurora on 12th, and fainter on the 13th.

IRELAND.

KILLALOE.—The predicted wave of heat certainly was felt here in August, though not in June, the mean temp. having been 65°·4, by far the highest recorded here for many years. No finer harvest month could have been experienced; brilliant aurora from 9.35 to 10 p.m. on 12th.

MONKSTOWN.—With the exception of the first week, the weather was fine and dry with light easterly winds; hot sun and considerable haze during the day and copious dews at night; the last days of the month were very hot.

WARINGSTOWN.—A splendid month from the 7th, which will secure the best harvest we have had for 20 years.

LONDONDERRY.—Wind variable; harvesting operations have seldom been so general during this month; grain crops extremely heavy.

SEVERE WINTER IN AUSTRALIA.

AMONG the items of Australian news weather of unusual severity is reported, and especially in New South Wales. Heavy snow had fallen on the 20th July in the Braidwood district, lying at least 2 ft. deep on the roads, and causing great destruction of flocks. In the Cooma district one squatter lost 500 sheep. In South Australia the cold is reported to be intense, and the fall of snow on the Flinders Range the heaviest experienced for the last 20 years.—*Times, Sept.* 13.